

Technology Report Card for Missouri

Recently, a study published for the state of Massachusetts identified six states as the Leading Technology States (LTS) in the nation. These states include California, Colorado, Connecticut, Minnesota, New Jersey, and New York. To identify these states, researchers studied a wide variety of data in the areas of innovation, state resources, and results indicators.

The Missouri Economic Research & Information Center (MERIC) has mirrored this study for the state of Missouri, using many of the economic indicators identified in the Massachusetts study, in the Corporation for Enterprise Development's (CFED) *Development Report Card for the States 2001*, and a few that are the unique contributions of MERIC. The purpose of this analysis is to present evidence that demonstrates Missouri's technological capabilities compared to the typical state in the union, as well as to the six states identified as technology leaders by Massachusetts. These indicators have been grouped into four categories: High Technology Industries, Money, Speed, and People.

In general, the conclusion to be drawn from this effort is that Missouri lags far behind the six states identified as technology leaders. In fact, there is much cause for concern, for in approximately half of the indicators chosen for the study, Missouri lags behind not only the technology leaders, but the national average as well. Alarming, this is true for all but one indicator in the Hi-Tech Industry category, the category MERIC has identified as most important in determining technology leaders.

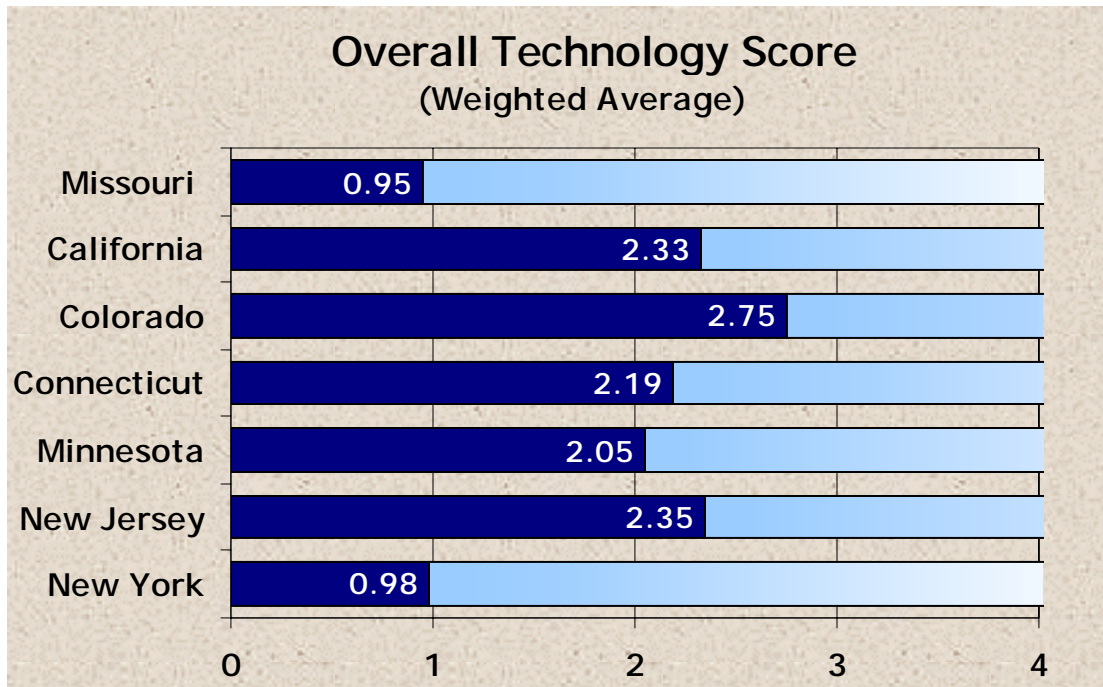
The figure on the following page presents a comparison of Missouri and the six LTS. Details about each specific indicator category can be found in the pages that follow. For each category, a state is given a score of 0 to 4, based on their performance. A state receives 1 star if it scores higher than at least 1 other LTS state, 2 stars if it scores higher than at least 3 other LTS states, and 3 stars if it scores higher than all other LTS states. Additionally, a state is given 1 star if it achieves a score higher than the US average for an individual indicator.

Connecticut received a score of 4 in eight categories, by far the most of all states in the study. Of these marks, four of the perfect scores occurred in the Hi-Tech category. By comparison, the Show-Me State received no marks of 4, and only three marks of 3 across all the categories. Further, Missouri outscored more than one other LTS state in only one aggregate category. Finally, and of great concern, Missouri received a combined score of 0.2 for the 10 Hi-Tech industry measures, indicating that the state is well below the national average in this area.

Technology Report Card for Missouri and the Leading Technology States

| | Missouri | CA | CO | CT | MN | NJ | NY |
|-------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Hi-Tech | | | | | | | |
| Employment in Hi-Tech Industries | 0 | 3 | 2 | 4 | 2 | 2 | 0 |
| 2000 Annual Average Pay -- All | 0 | 3 | 2 | 4 | 2 | 3 | 2 |
| 2000 Annual Average Pay -- Hi-Tech | 0 | 3 | 1 | 4 | 0 | 3 | 1 |
| Total R&D Per Capita | 0 | 3 | 2 | 3 | 1 | 4 | 0 |
| R&D as a % of GSP | 0 | 4 | 3 | 1 | 1 | 3 | 0 |
| Industry % of R&D Expenditures | 0 | 2 | 1 | 3 | 3 | 4 | 2 |
| Federal R&D Obligations | 2 | 4 | 3 | 1 | 1 | 3 | 0 |
| Patents Per Million Population | 0 | 3 | 2 | 4 | 3 | 2 | 1 |
| Utility Patents as a % of all Patents | 0 | 2 | 3 | 1 | 4 | 3 | 0 |
| SBIR Awards | 0 | 3 | 4 | 3 | 1 | 2 | 0 |
| Score | 0.2 | 3.0 | 2.3 | 2.8 | 1.8 | 2.9 | 0.6 |
| Money | | | | | | | |
| SBIC Program Financing to Small Businesses Per Capita | 0 | 3 | 4 | 3 | 2 | 2 | 1 |
| Venture Capital Investments | 0 | 4 | 3 | 2 | 0 | 3 | 1 |
| Private Lending to Small Businesses | 3 | 1 | 2 | 0 | 4 | 1 | 2 |
| Manufacturing Capital Expenditures per Mfg. Employee | 2 | 2 | 4 | 1 | 1 | 3 | 0 |
| Score | 1.3 | 2.5 | 3.3 | 1.5 | 1.8 | 2.3 | 1.0 |
| Speed | | | | | | | |
| Gazelle Jobs | 3 | 4 | 2 | 1 | 2 | 1 | 0 |
| Employer Firm Births as a % of all Employer Firms | 2 | 3 | 4 | 1 | 2 | 0 | 3 |
| Employer Firm Deaths as a % of all Employer Firms | 1 | 0 | 3 | 1 | 4 | 1 | 1 |
| Computers and Internet in the Household | 0 | 2 | 4 | 2 | 3 | 3 | 0 |
| Digital Infrastructure | 2 | 0 | 2 | 2 | 1 | 4 | 1 |
| Score | 1.6 | 1.8 | 3.0 | 1.4 | 2.4 | 1.8 | 1.0 |
| People | | | | | | | |
| Per Capita Personal Income | 0 | 2 | 2 | 4 | 1 | 3 | 3 |
| Annual Unemployment Rate | 2 | 0 | 3 | 4 | 3 | 2 | 1 |
| Poverty Rate | 2 | 1 | 2 | 3 | 4 | 3 | 0 |
| NAEP Math Scores | 2 | 0 | 2 | 3 | 4 | | 2 |
| NAEP Science Scores | 2 | 0 | 2 | 2 | 4 | | 2 |
| HS Graduate | 3 | 0 | 3 | 3 | 4 | 3 | 1 |
| College Graduate | 1 | 1 | 4 | 3 | 3 | 2 | 2 |
| S&E Graduate Students | 0 | 2 | 3 | 3 | 1 | 0 | 4 |
| S&E Doctorates | 1 | 2 | 3 | 4 | 2 | 0 | 3 |
| Ph.D. Scientists as a % of the Workforce | 0 | 2 | 2 | 4 | 1 | 3 | 2 |
| Score | 1.3 | 1.0 | 2.6 | 3.3 | 2.7 | 2.0 | 2.0 |
| Overall Score (Weighted Average) | 0.95 | 2.33 | 2.75 | 2.19 | 2.05 | 2.35 | 0.98 |

Note: Categories were weighted according to their relative importance to technology. The Hi-Tech category was assigned a weight of 3; Money and Speed were weighted 2 each, and the People category was given a weight of 1.



Admittedly, the results of this study of Missouri's technological capacity could be considered severe, for it is partial toward those states identified as technology leaders. It was not expected that Missouri would beat every LTS on every indicator. However, the expectation did exist that Missouri, at a minimum, could be considered competitive. Clearly, this is not this case.

Thus, policy makers and business leaders in Missouri must begin exploring ways to increase Missouri's technological capacity, and with an acute sense of urgency. One of the greatest lessons of the 1990s is that technology is a driving force behind sparking and sustaining economic growth. For Missouri to become competitive with leading states and thereby improve its economic conditions, the state must begin to increase its technological capacity.

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HI-TECH

High Technology Industries Category

Obviously, leading technology states value Hi-Tech Industries. Average annual pay in hi-tech industries is much higher than for other industries increasing the quality of life in a state. Research and development activities in these industries lead to idea generation and the start of the innovation process – the foundation for advances in technology.

The United States Bureau of Labor Statistics defines technology intensive (hi-tech) industries as those industries that employ at least twice as many research and development employees as the average industry. These industries are listed in the table below.

| U.S. Bureau of Labor Statistics <i>High-Technology Industries</i> | |
|----------------------------------------------------------------------|----------------------------------------|
| SIC | Description |
| 281 | Industrial Inorganic Chemicals |
| 282 | Plastics Materials and Synthetics |
| 283 | Drugs |
| 284 | Soap, Cleaners, and Toilet Goods |
| 285 | Paints and Allied Products |
| 287 | Agricultural Chemicals |
| 289 | Miscellaneous Chemical Products |
| 291 | Petroleum Refining |
| 348 | Ordinance and Accessories, NEC |
| 351 | Engines and Turbines |
| 353 | Construction and Related Machinery |
| 355 | Special Industry Machinery |
| 356 | General Industrial Machinery |
| 357 | Computer and Office Equipment |
| 361 | Electric Distribution Equipment |
| 362 | Electrical Industrial Apparatus |
| 365 | Household Audio and Video Equipment |
| 366 | Communications Equipment |
| 367 | Electronic Components and Accessories |
| 371 | Motor Vehicles and Equipment |
| 372 | Aircraft and Parts |
| 376 | Guided Missiles, Space Vehicles, Parts |
| 381 | Search and Navigation Equipment |
| 382 | Measuring and Controlling Devices |
| 384 | Medical Instruments and Supplies |
| 386 | Photographic Equipment and Supplies |
| 737 | Computer and Data Processing Services |
| 871 | Engineering & Architectural Services |
| 873 | Research and Testing Services |
| 874 | Management and Public Relations |

As expected, the six LTS generally score very high marks in the Hi-Tech Industries Category, with the exception being the state of New York. Connecticut received a perfect score of 4 in four individual categories. California never scored below a 2, and only received this score twice. Similarly, New Jersey received only three marks of 2.

Missouri scores below the U.S. average for each specific indicator in this category. Further, Missouri out-performed the LTS in only one of these indicators. As a result, Missouri received an overall score of only 0.2 for the Hi-Tech Industries Category.

While it is troubling that Missouri's score is below the LTS and the U.S., New York's position with this indicator demonstrates that a state's level of technological innovation is determined by many factors.

High Technology Industries Report Card

| | Missouri | CA | CO | CT | MN | NJ | NY |
|---------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| Hi-Tech | | | | | | | |
| Employment in Hi-Tech Industries | 0 | 3 | 2 | 4 | 2 | 2 | 0 |
| 2000 Annual Average Pay -- All | 0 | 3 | 2 | 4 | 2 | 3 | 2 |
| 2000 Annual Average Pay -- Hi-Tech | 0 | 3 | 1 | 4 | 0 | 3 | 1 |
| Total R&D Per Capita | 0 | 3 | 2 | 3 | 1 | 4 | 0 |
| R&D as a % of GSP | 0 | 4 | 3 | 1 | 1 | 3 | 0 |
| Industry % of R&D Expenditures | 0 | 2 | 1 | 3 | 3 | 4 | 2 |
| Federal R&D Obligations | 2 | 4 | 3 | 1 | 1 | 3 | 0 |
| Patents Per Million Population | 0 | 3 | 2 | 4 | 3 | 2 | 1 |
| Utility Patents as a % of all Patents | 0 | 2 | 3 | 1 | 4 | 3 | 0 |
| SBIR Awards | 0 | 3 | 4 | 3 | 1 | 2 | 0 |
| Score | 0.2 | 3.0 | 2.3 | 2.8 | 1.8 | 2.9 | 0.6 |

HI-TECH

Employment in High-Tech Industries

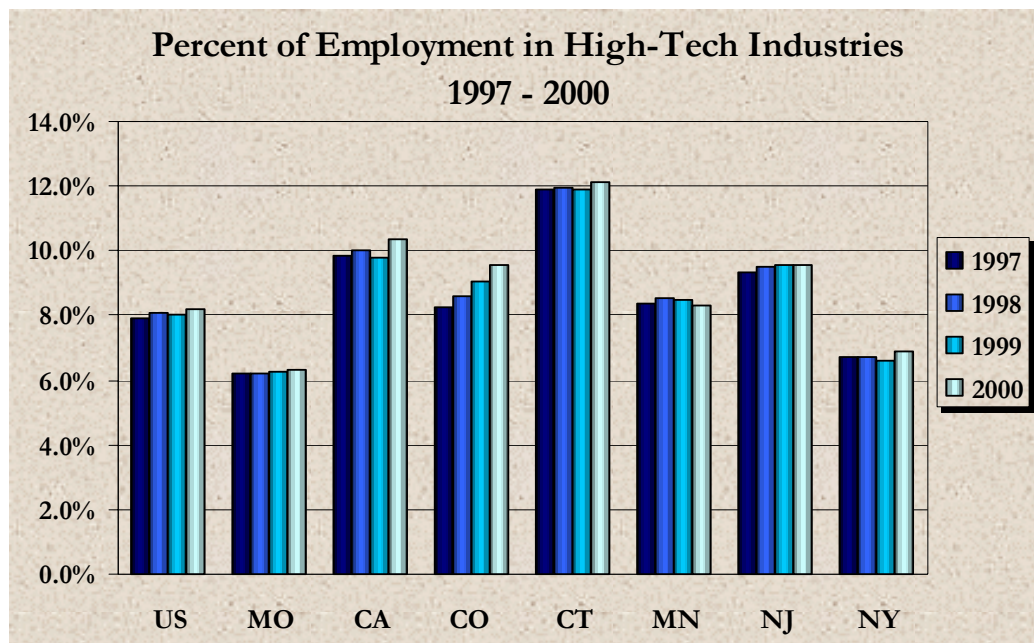
The amount of employment in industries that are technology intensive is an indicator of a state's level of technological innovation. For this measure, thirty industries identified by the U.S. Bureau of Labor Statistics as High-Technology Industries were used. BLS deems industries "high-tech" if they employ at least twice as many research and development employees as the average number for all industries.

Employment in high-tech industries made up 6.33 percent of Missouri's total nonfarm employment in 2000. That was nearly 2 percentage points below the 2000 national average of 8.18 percent.

From 1997 to 2000, Missouri's percentage of employment in high-tech industries

increased slightly, from 6.19 percent in 1997 to 6.33 percent in 2000.

High-tech industry employment in California, Colorado, Connecticut, Minnesota, New Jersey, and New York (states identified by the Massachusetts Technology Collaborative as Leading Technology States) were mixed compared to the U.S. average. California, Colorado, Connecticut and New Jersey were above the U.S. while Minnesota hovered close to the national average. Interestingly, the percentage of high-tech employment in New York, a state commonly considered to be a technology leader, ranked below the U.S. and just above Missouri.



Source: U.S. Bureau of Labor Statistics

HI-TECH

Average Annual Pay

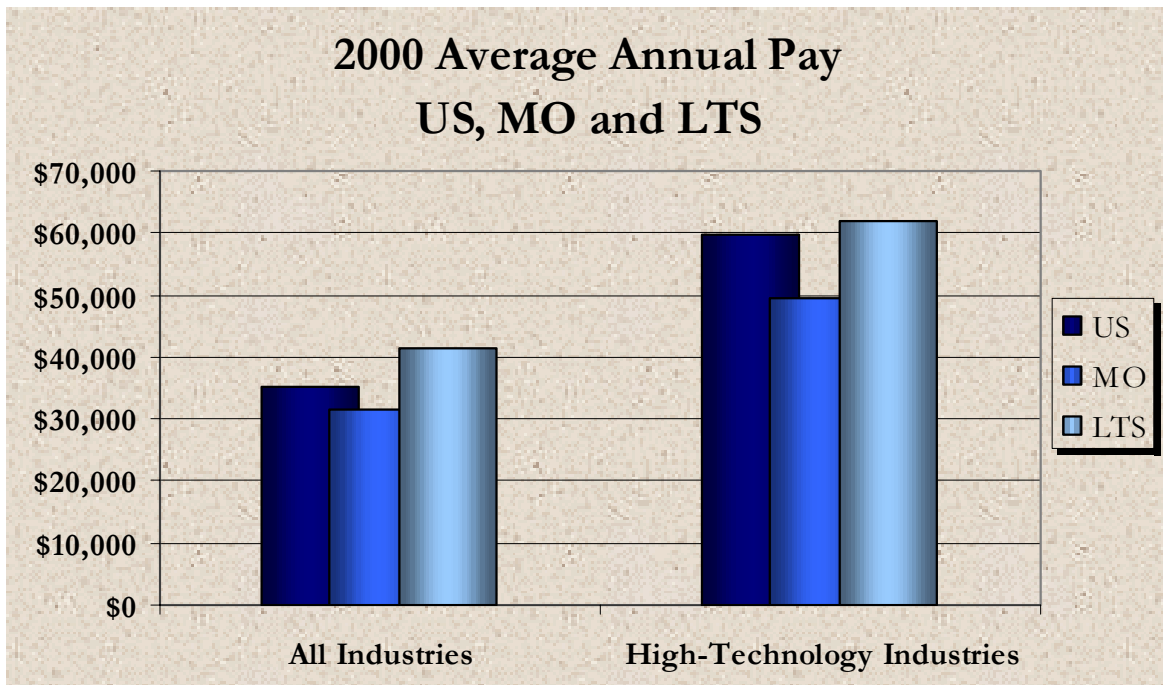
Average annual pay serves as an indicator of a state's quality of life and standard of living. It can also be used to measure how Missourians are doing compared to averages in the U.S. and other states.

The average annual pay for all industries in Missouri in 2000 was \$31,385, compared to \$35,323 for the U.S. and an average of \$41,381 in Leading Technology States (LTS).

In the BLS defined High-Technology (HT) Industries, annual pay is considerably higher. In Missouri, average annual pay in HT

industries was \$49,494 in 2000, \$18,000 more than the state averages. The U.S. HT average was even higher at \$59,669, nearly \$10,000 above Missouri's average annual pay in HT industries. LTS annual average pay in HT industries was above the U.S. average at \$61,992.

While the difference between average annual pay in all industries in Missouri and the U.S. was just under \$4,000, the difference in HT industries is much greater, more than a \$10,000 difference per year.



Source: U.S. Bureau of Labor Statistics

HI-TECH

Research and Development Expenditures

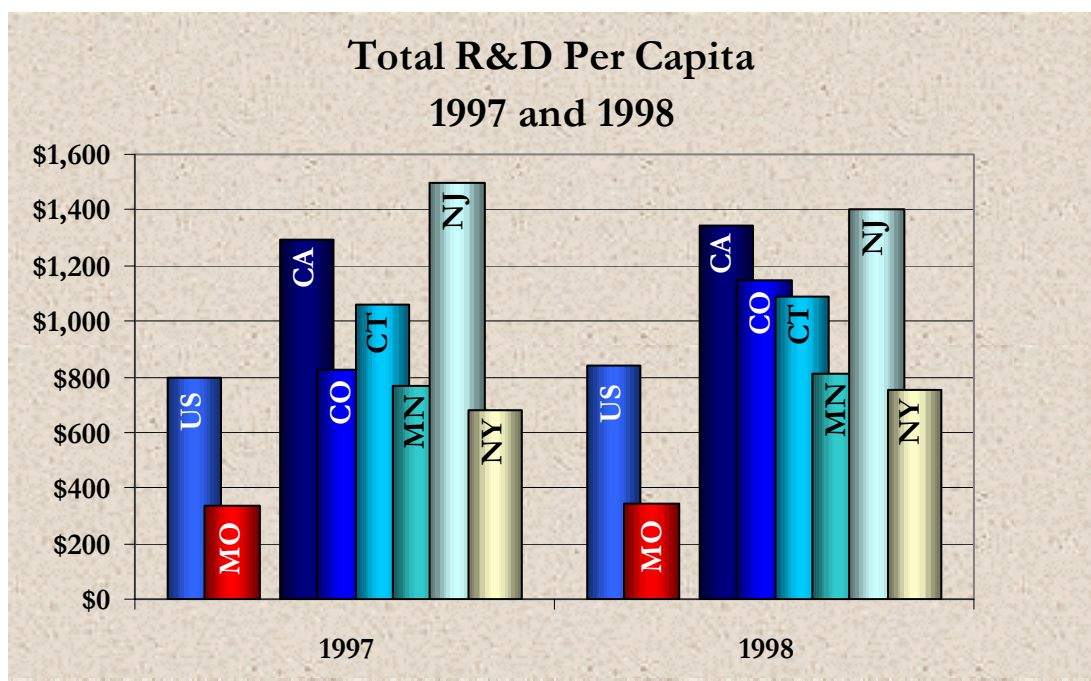
Research and development (R&D) expenditures serve as a measure of the technological innovation of a state. Economic growth is widely associated with new research advances and the commercialization of technology. Each offers the prospects for business growth, more high-wage jobs, better quality of life, and greater statewide prosperity.

Total research and development expenditures as a function of population and Gross State Product (GSP) are examined.

According to data analyzed by MERIC from the National Science Foundation, U.S.

Bureau of Economic Analysis, and the U.S. Census Bureau, per capita research and development expenditures in Missouri in 1997 and 1998 were \$338 and \$344, respectively. This is less than half the U.S. per capita averages of \$793 and \$839 for 1997 and 1998. (State data for 1998 is the most current available.)

Further, per capita R&D expenditures in California, Colorado, Connecticut, Minnesota, New Jersey, and New York (states identified by the Massachusetts Technology Collaborative as Leading Technology States) also far exceeded Missouri's per capita R&D expenditures and generally were above that of the U.S.



Source: National Science Foundation and U.S. Census Bureau
Analysis by MERIC

HI-TECH

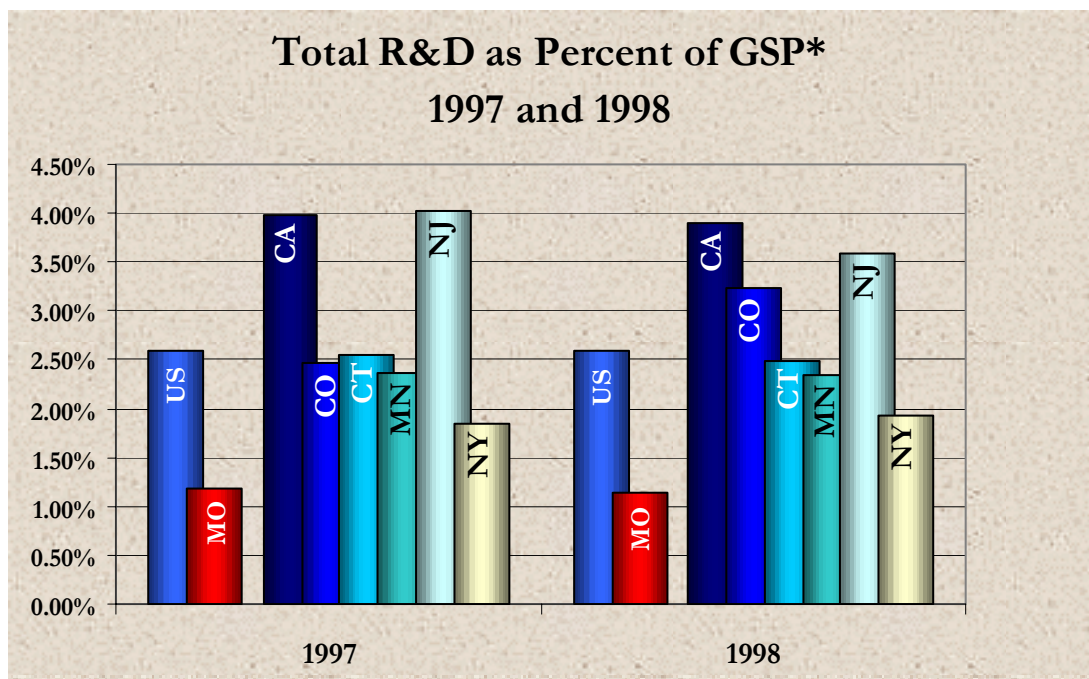
Another way to view R&D expenditures is as a percent of Gross State Product (GSP).

Research and development expenditures as a percent of Missouri's GSP in 1997 and 1998 were 1.17% and 1.14% respectively, more than a full percentage point less than the U.S. averages of 2.58% and 2.59% each year. California and New Jersey led in R&D expenditures as a percent of GSP.

Missouri fell below the U.S. average in total research and development in 1997 and 1998. Additionally, states considered forerunners in technology generally more than doubled

Missouri in research and development spending per capita and as a percent of GSP.

While research and development spending is only one factor of many in determining the technological innovation of a state, Missouri's ranking compared to other states and the U.S. is somewhat disconcerting and calls for improvement.



*U.S. figures use a sum of all state GSP.

Source: National Science Foundation and U.S. BEA
Analysis by MERIC

HI-TECH

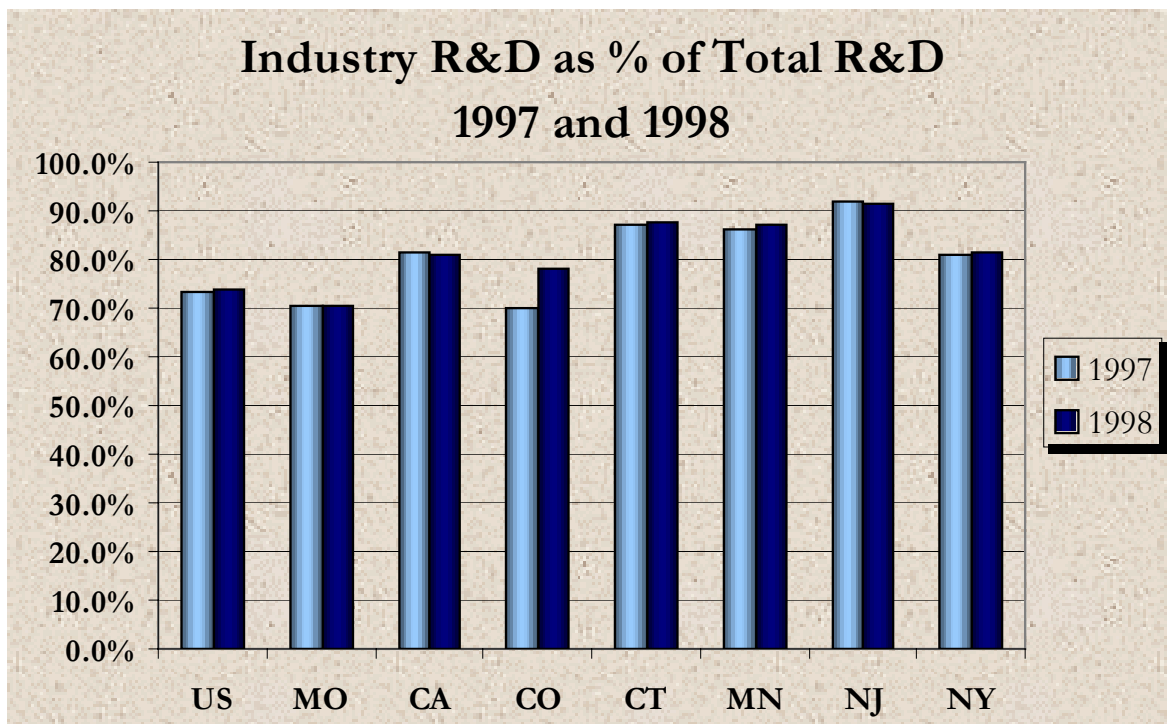
Industry R&D Expenditures

Industry Research and Development Expenditures, a portion of total R&D expenditures, serve as an estimate of private R&D activity. This indicator primarily reflects large corporations' contribution to research and development activities.

Missouri ranked below the U.S. and Leading Technology States in Industry Research and Development Expenditures as a percentage of total R&D expenditures. In 1998, 70.3 percent of Missouri's total R&D was in industry R&D expenditures. The U.S. average percent in 1998 was 73.7 percent of total R&D.

In 1998, industry R&D expenditures as a percent of total R&D in Leading Technology States were above Missouri, ranging from 78.1 percent in Colorado to New Jersey's 91.6 percent.

LTS averages were above Missouri and the U.S. with the exception of Colorado ranking just below the Missouri average in 1997, but above Missouri and the U.S. in 1998.



*U.S. figures use a sum of all state GSP.

Source: National Science Foundation and U.S. BEA
Analysis by MERIC

HI-TECH

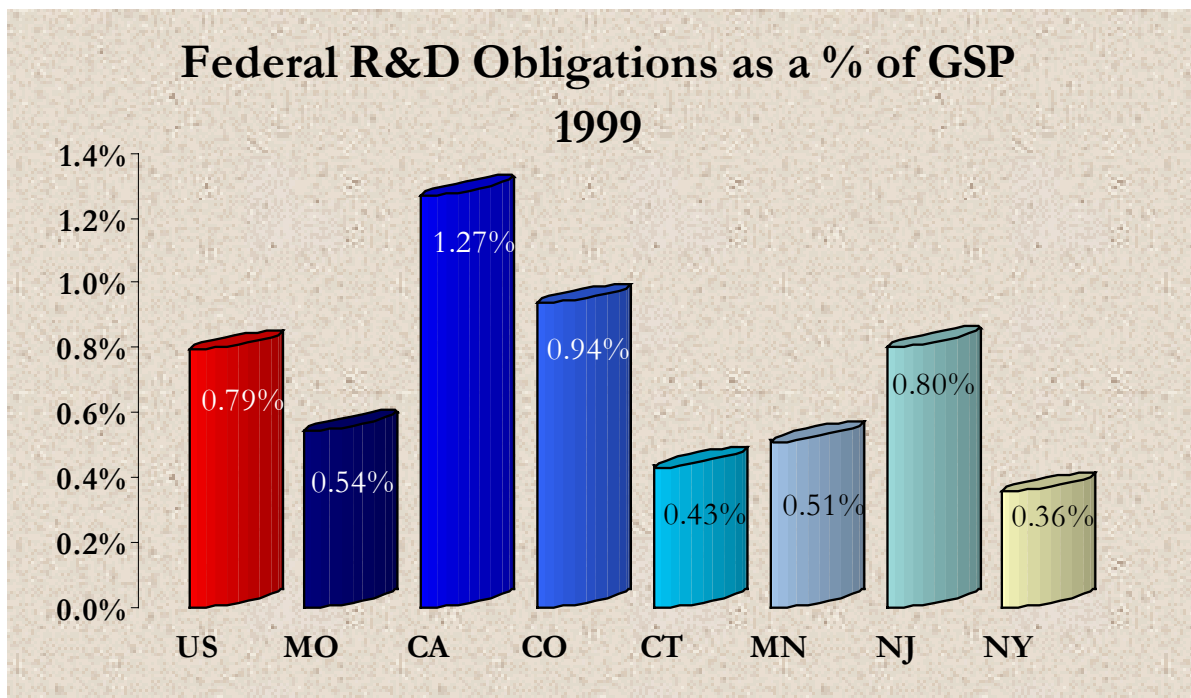
Federal R&D Obligations

Federal Research and Development Obligations in the National Science Foundation's Survey of Federal Funds for Research and Development represent "the amounts for orders placed, contracts awarded, services received, and similar transactions during a given period, regardless of when the funds were appropriated and when future payments of money is required". This indicator serves as a measure of federally funded research and development activities in a state.

Federal R&D obligations represent 0.54 percent of Missouri's Gross State Product (GSP). This is 0.25 percentage point under

the national average of 0.79 percent. Missouri ranked in the middle of LTS, above Connecticut (0.43 percent), Minnesota (0.51 percent) and New York (0.36 percent).

LTS that ranked above both Missouri and the U.S. in 1999 were California (1.27 percent), Colorado (0.94 percent) and New Jersey (0.80 percent).



*U.S. figures use a sum of all state GSP.

Source: National Science Foundation and U.S. BEA
Analysis by MERIC

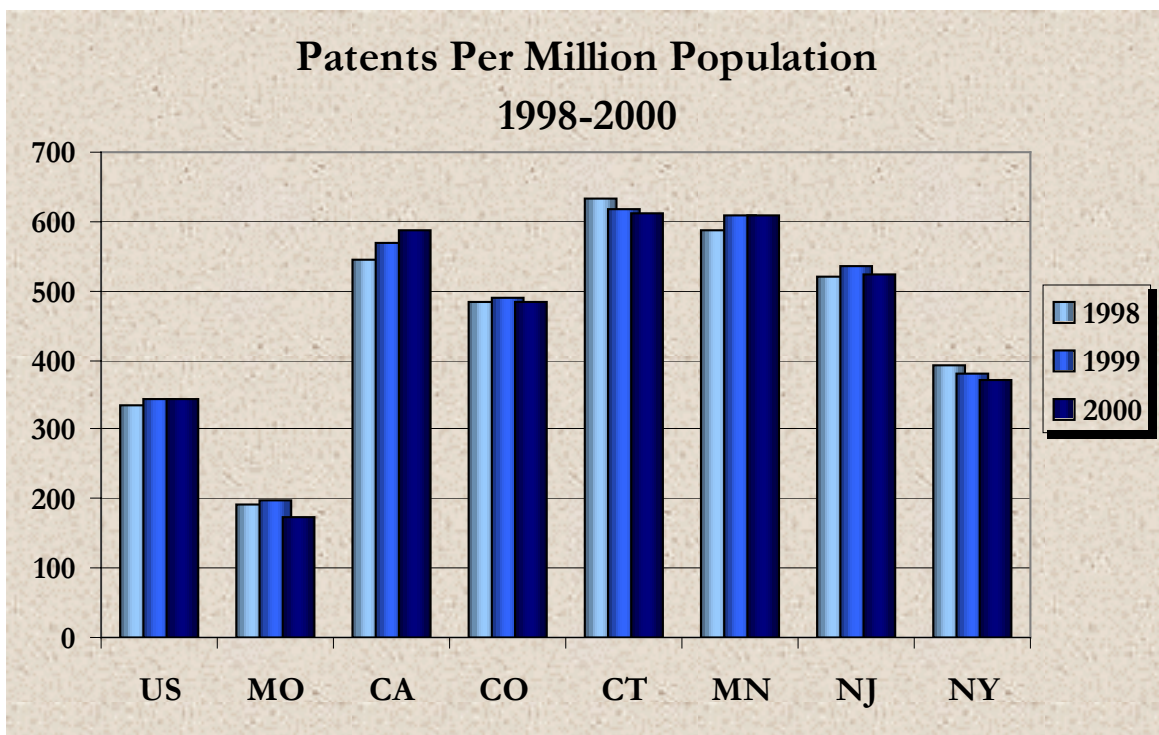
HI-TECH

Patents Issued

Patents represent the creation of new ideas and concepts. The number of patents issued measures the rate of innovation in a state. It should be noted that the patent location is credited to the company headquarters, not the location of the innovation.

From 1998 to 2000, Missouri ranked below the U.S. and LTS in patents issued per one million population. In 2000, Missouri averaged 173 patents for every million people in the state. That is approximately one-half of the U.S. average for that year of 345 patents per million population.

With the exception of New York, the LTS far surpassed the U.S. average of patents issued from 1998 to 2000. Connecticut averaged 613 patents per million population in 2000, the most patents per million population of the LTS, and more than triple that of Missouri.



Source: U.S. Patent and Trademark Office, U.S. Census Bureau

HI-TECH

Patents of Invention

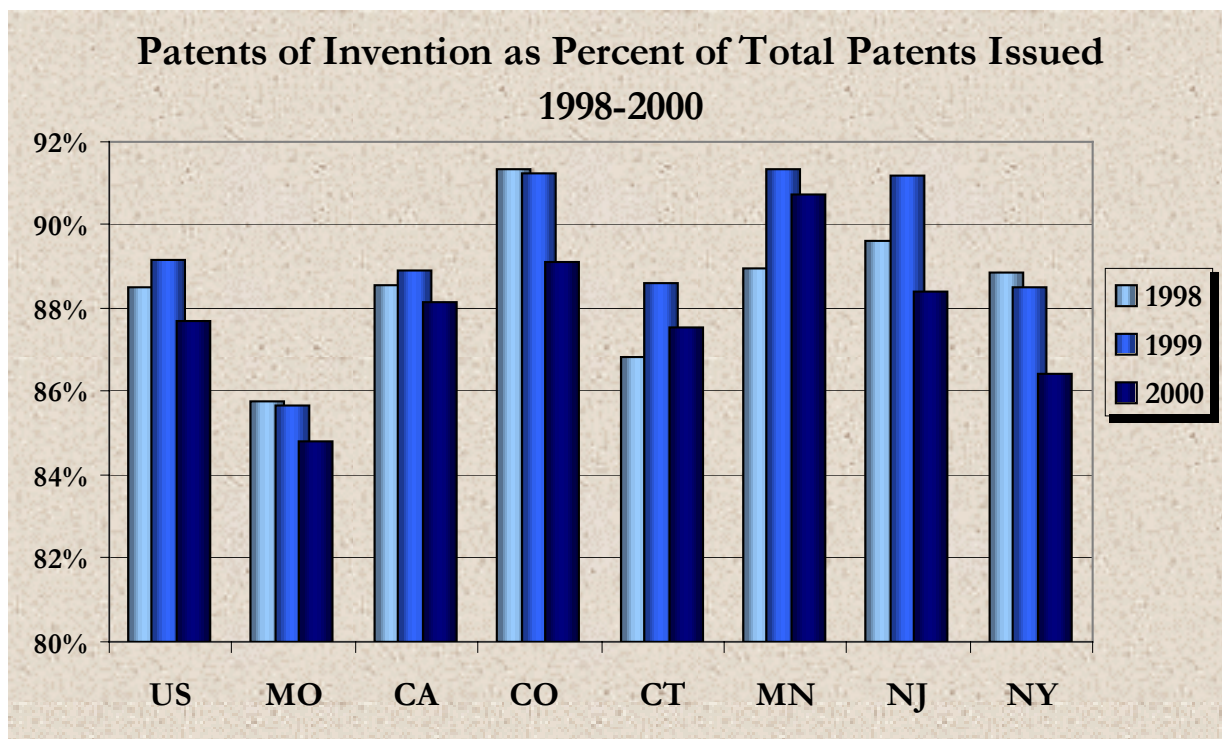
Utility patents, commonly called “patents of invention” are patents issued for “the invention of a new and useful process, machine, manufacture, or composition of matter, or a new and useful improvement thereof...” As a portion of total patents issued, patents of invention closely relate to technological advances.

Patents of invention make up the majority of patents issued. Missouri remained behind the U.S. and LTS average in patents of invention as a percent of total patents issued from 1998 to 2000.

In 2000, 84.8 percent of Missouri’s total patents issued were patents of invention, less than the 87.7 percent in the U.S.

Of the LTS, Minnesota was the leader in 2000, with patents of invention making up 90.7 percent of total patents issued in the state.

Of the leading technology states, Connecticut (87.5 percent) and New York (86.5 percent) were below the U.S. average of patents of invention from 1998 to 2000.



Source: U.S. Patent and Trademark Office, U.S. Census Bureau

HI-TECH

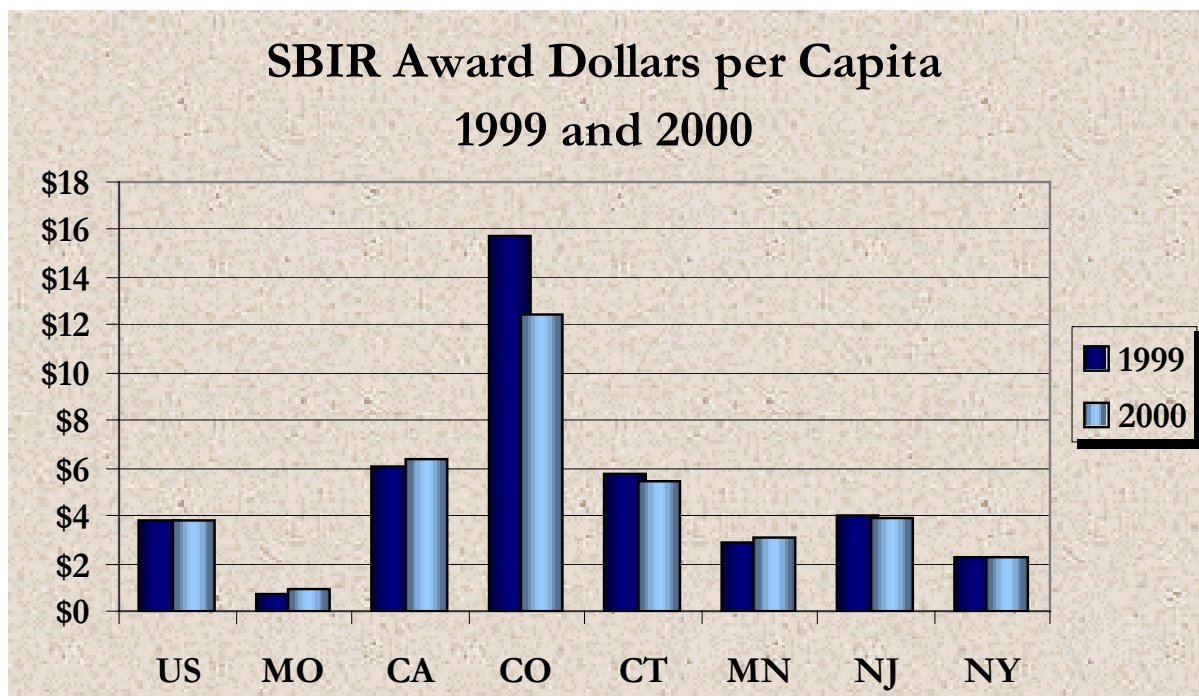
SBIR Awards

The Small Business Innovation Research (SBIR) Program is a federally funded program that sets aside a percentage of federal R&D funds from ten departments to encourage small businesses to participate in the innovation and creation process. Awards are based on small business qualification, degree of innovation, technical merit, and future market potential of the innovation.

In 2000, the average amount of SBIR award per capita in the U.S. was \$3.80. In Missouri in 2000, the per capita SBIR award was \$0.89 in 2000, far below the U.S. average.

Of the LTS, Colorado had the highest SBIR award per capita, at \$12.47. The lowest LTS average, \$2.23 in New York, was still more than twice the Missouri average.

Although Missouri's average was below the U.S. and LTS for both years, per capita SBIR awards did increase \$0.16 in the state from 1999 to 2000.



Source: U.S. Small Business Administration, U.S. Census Bureau

Money

Money Category

Entrepreneurship is a critical factor in the innovation process. Entrepreneurs take new ideas and concepts, apply them to products and services, and connect them to the marketplace through commercialization. Nurturing these entrepreneurs with financial support in the form of grants, loans and other financing options is a valuable asset in technological innovation.

Colorado emerges as the clear leader in this category, receiving two marks of 4 and no marks below 2. California place second, buoyed upward by its leadership in venture capital investments.

Missouri did not compete well in this category. The low scores in this category suggest that Missouri needs to make a better effort to secure financing, especially in the areas of venture capital and small business financing. These two categories are particularly important to developing the entrepreneur base that is vital to economic growth.

Money Report Card

| | Missouri | CA | CO | CT | MN | NJ | NY |
|-------------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| Money | | | | | | | |
| SBIC Program Financing to Small Businesses Per Capita | 0 | 3 | 4 | 3 | 2 | 2 | 1 |
| Venture Capital Investments | 0 | 4 | 3 | 2 | 0 | 3 | 1 |
| Private Lending to Small Businesses | 3 | 1 | 2 | 0 | 4 | 1 | 2 |
| Manufacturing Capital Expenditures per Mfg. Employee | 2 | 2 | 4 | 1 | 1 | 3 | 0 |
| Score | 1.3 | 2.5 | 3.3 | 1.5 | 1.8 | 2.3 | 1.0 |

Money

SBIC Financing

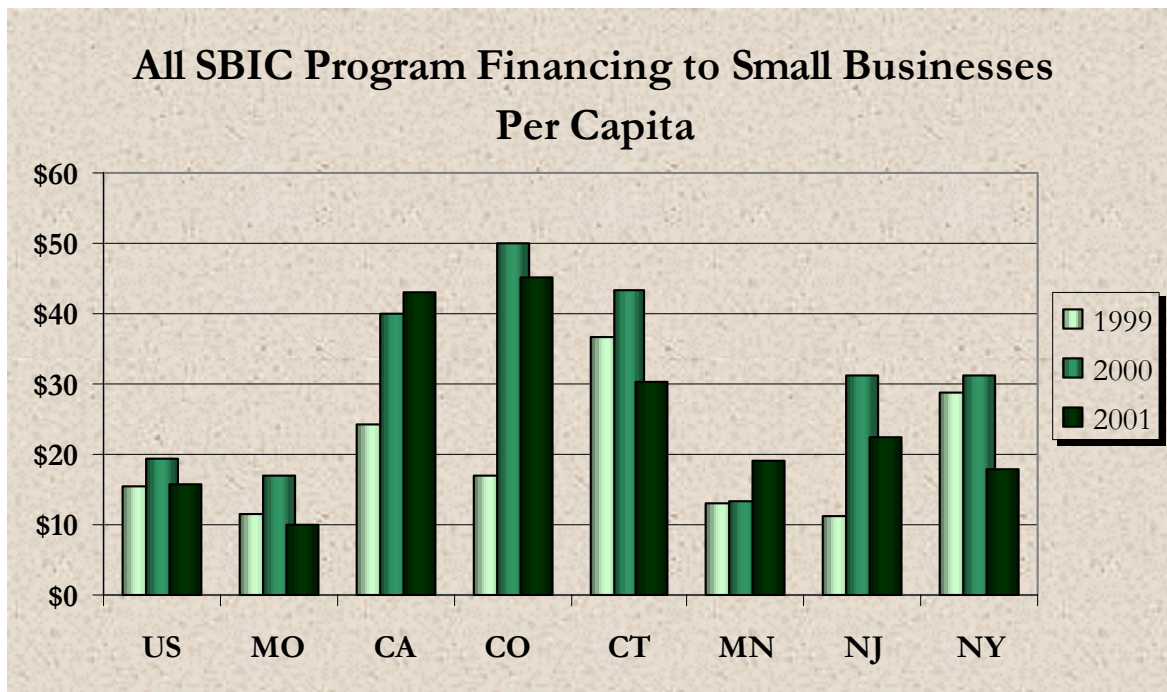
Small Business Investment Companies (SBIC) are federally licensed investment companies that target financing to economically and socially disadvantaged entrepreneurs. Forms of financing include long-term loans, equity and convertible debt. SBICs invest exclusively in small business and in turn qualify for federal Small Business Administration guarantees. This financing benefits small businesses and entrepreneurs that are vital to a state's continued economic growth.

Missouri ranked below the U.S. average in per capita SBIC financing in 1999 through 2000, as well as below the leading technology states.

In 2001, per capita SBIC financing in Missouri was \$10, down \$7 from 2000. The U.S. per capita average in 2001 was \$16, also down from the year before.

The Leading Technology States of California, Colorado and Connecticut consistently ranked above both Missouri and the U.S.

While in 1999 Missouri's average of \$11 was similar to that of Minnesota and New Jersey, those states recently exceeded Missouri in 2001.



Source: U.S. Small Business Administration

Money

Venture Capital Investments

Venture Capital Investments fund new firms and start-up businesses with high growth potential. Investors generally provide funds in exchange for equity. Venture capital investments can often be a sign of future prosperity in an area.

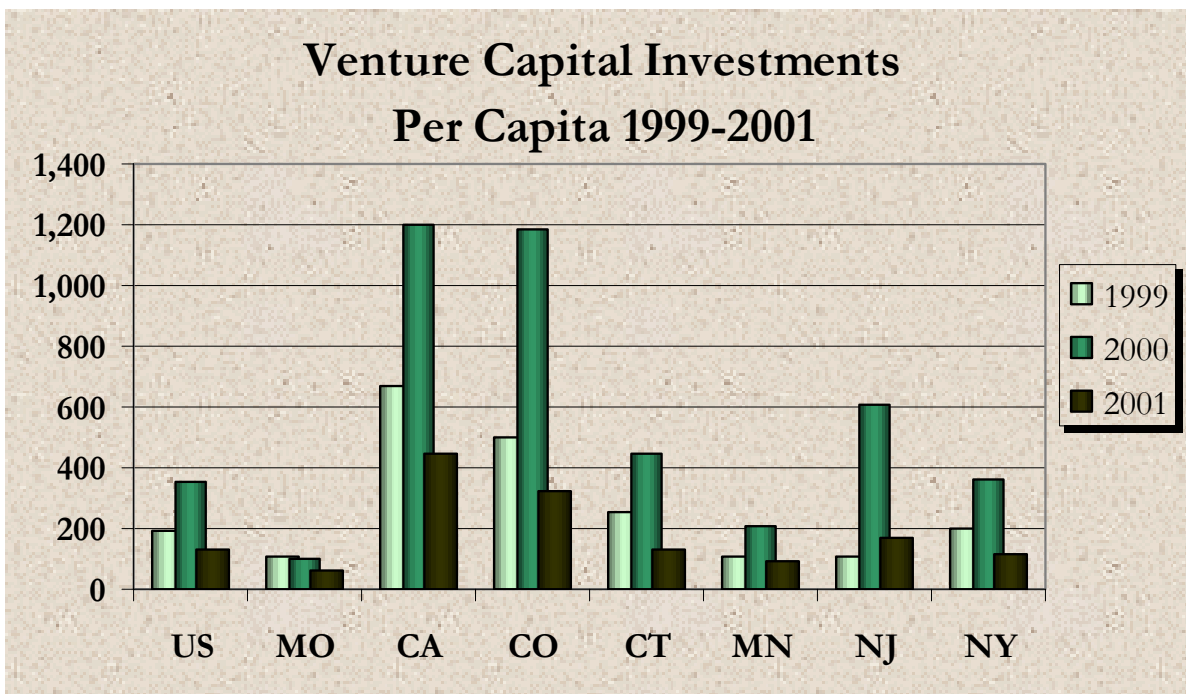
In the U.S. and LTS, there was a significant jump in venture capital investments in 2000, followed by a sharp drop-off in 2001. Missouri was an exception, seeing steady decreases from 1999 to 2001.

In 2001, per capita venture capital investments in the U.S. averaged \$128.

Missouri's average was just under half of the U.S., at \$63 per person.

Of the LTS, California (\$445), Colorado (\$323) and New Jersey (\$169) were above the national average in 2000.

Other LTS ranked below the U.S. and closer to Missouri: Connecticut (\$127), New York (\$113) and Minnesota (\$91).



Source: PricewaterhouseCoopers Moneytree Survey

Money

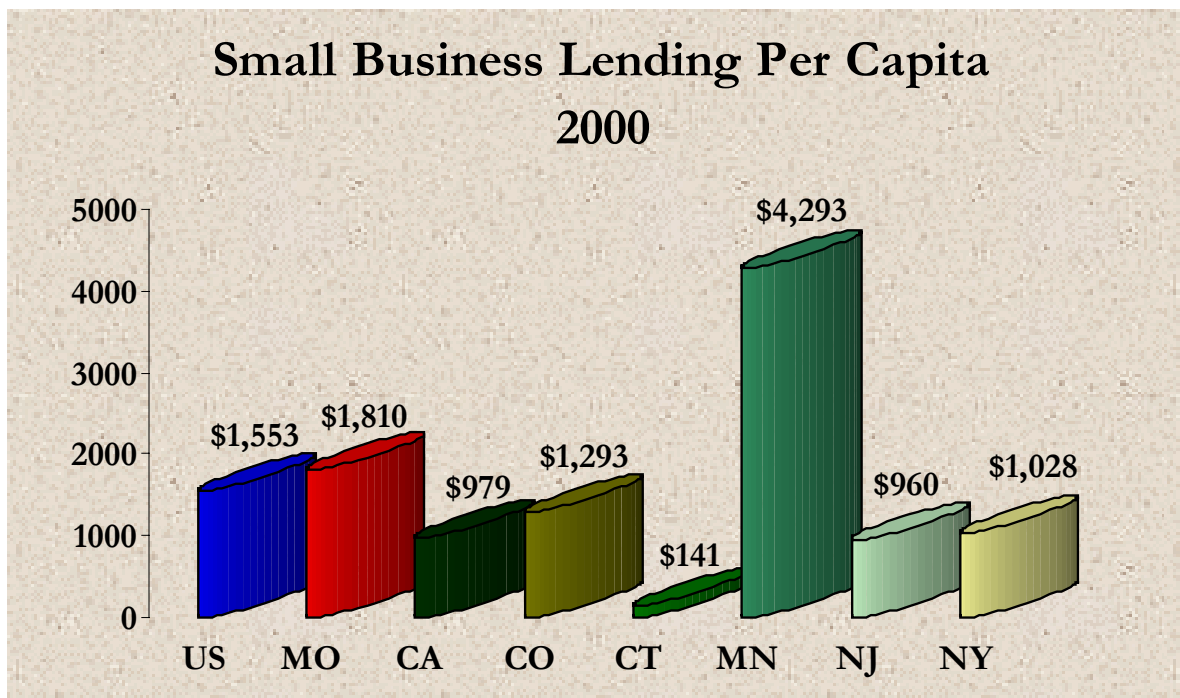
Private Lending to Small Businesses

According to the U.S. Small Business Administration, small businesses represent more than 99 percent of all employers, employ approximately half of all employees and are responsible for most new job creation. Therefore, the success of small businesses is important to any state. This particular indicator measures the amount of commercial lending to small businesses.

In 2000, per capita private small business lending in Missouri was \$1,810, above the U.S. average of \$1,553 per person.

Minnesota was the only LTS with a higher level of per capita small business lending, averaging much higher at \$4,293 per person.

Leading Technology States having lower per capita small business lending in 2000 were Colorado (\$1,293), New York (\$1,028), California (\$979), New Jersey (\$960) and Connecticut (\$141).



Source: U.S. Small Business Administration

Money

Manufacturing Capital Expenditures

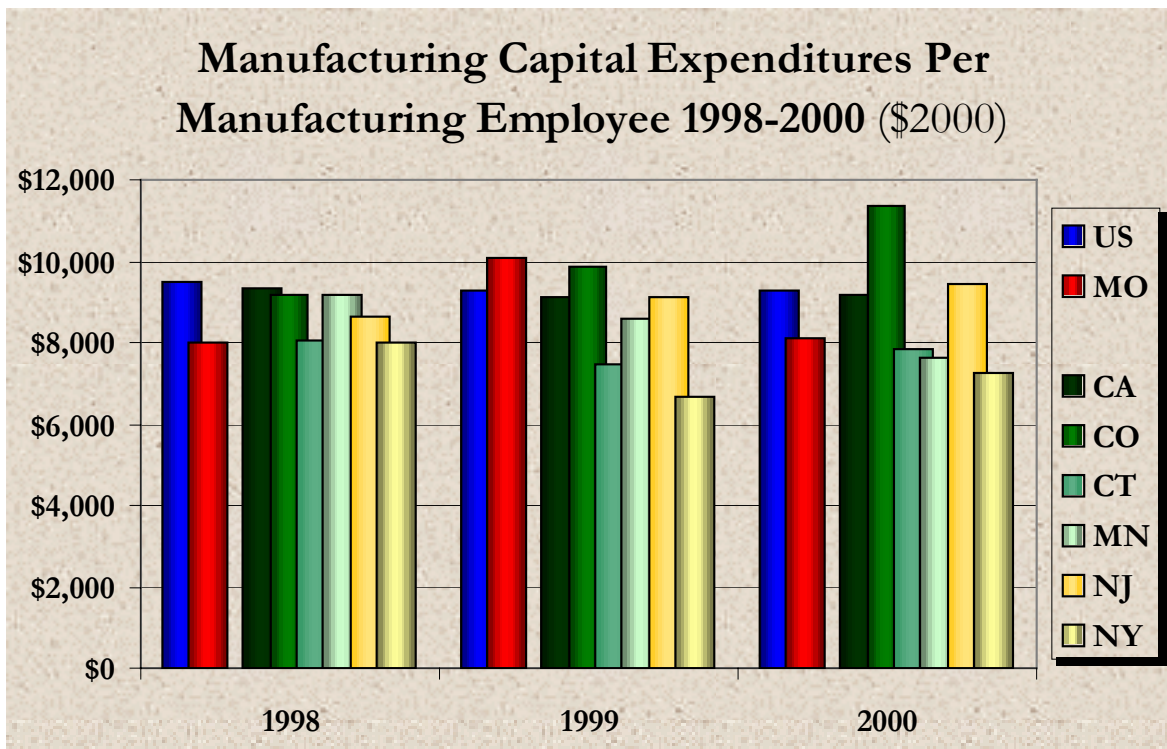
Manufacturing capital expenditures provide a gauge of the amount manufacturing companies spend to upgrade operations and of a state's ability to renew its production capacity.

Manufacturing capital expenditures in Missouri topped \$2.9 billion in 2000. Missouri's average manufacturing capital expenditure was \$8,130 per manufacturing employee. This was under the U.S. average of \$9,287.

Colorado was the LTS with the highest manufacturing capital expenditure per employee in 2000 at \$11,377.

Other LTS above Missouri's average were New Jersey (\$9,449) and California (\$9,152).

Missouri ranked above three of the LTS in manufacturing capital expenditures per manufacturing employee in 2000: Connecticut (\$7,820), Minnesota (\$7,626) and New York (\$7,254).



Source: U.S. Census Bureau, Survey of Manufacturers

Speed

Speed Category

Technology partners with change. Citizens, businesses, and government leaders in a state must be able to adapt to new ideas quickly. The development of new businesses refreshes a state's business vitality. Likewise, states must have strong telecommunications abilities to keep up with the rapid pace of change.

The state of Colorado scored very high in this category, far ahead of all other states. The state received two marks of 4, and no marks below 2 for any individual indicator. California is the leader in business growth, scoring a perfect 4 in the category of fast-growing Gazelle Jobs, and a 3 in the ratio of Employer Births to Total Employer Firms in the state.

Missouri is competitive in the Speed Category. The state received a score of 3 on the Gazelle Jobs indicator, a score of 2 in Employer Firm Births as a Percent of all Employer Firms and a score of 2 for its Digital Infrastructure. Missouri out-scored both New York and Connecticut in the Speed Category. The Computers and Internet in the Household indicator is a source of some concern for the state, as Missouri did not score above the national average.

Speed Report Card

| | Missouri | CA | CO | CT | MN | NJ | NY |
|---------------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| Speed | | | | | | | |
| Gazelle Jobs | 3 | 4 | 2 | 1 | 2 | 1 | 0 |
| Employer Firm Births as a % of all Employer Firms | 2 | 3 | 4 | 1 | 2 | 0 | 3 |
| Employer Firm Deaths as a % of all Employer Firms | 1 | 0 | 3 | 1 | 4 | 1 | 1 |
| Computers and Internet in the Household | 0 | 2 | 4 | 2 | 3 | 3 | 0 |
| Digital Infrastructure | 2 | 0 | 2 | 2 | 1 | 4 | 1 |
| Score | 1.6 | 1.8 | 3.0 | 1.4 | 2.4 | 1.8 | 1.0 |

Speed

Gazelle Jobs

Gazelle Companies are defined as companies with annual sales revenues that have grown 20 percent or more for four straight years. Gazelle Jobs are jobs in those companies as a share of total employment. This indicator serves as a measure of a state's adaptability and growth particularly in industries that tend to be rapidly changing, as in high-technology.

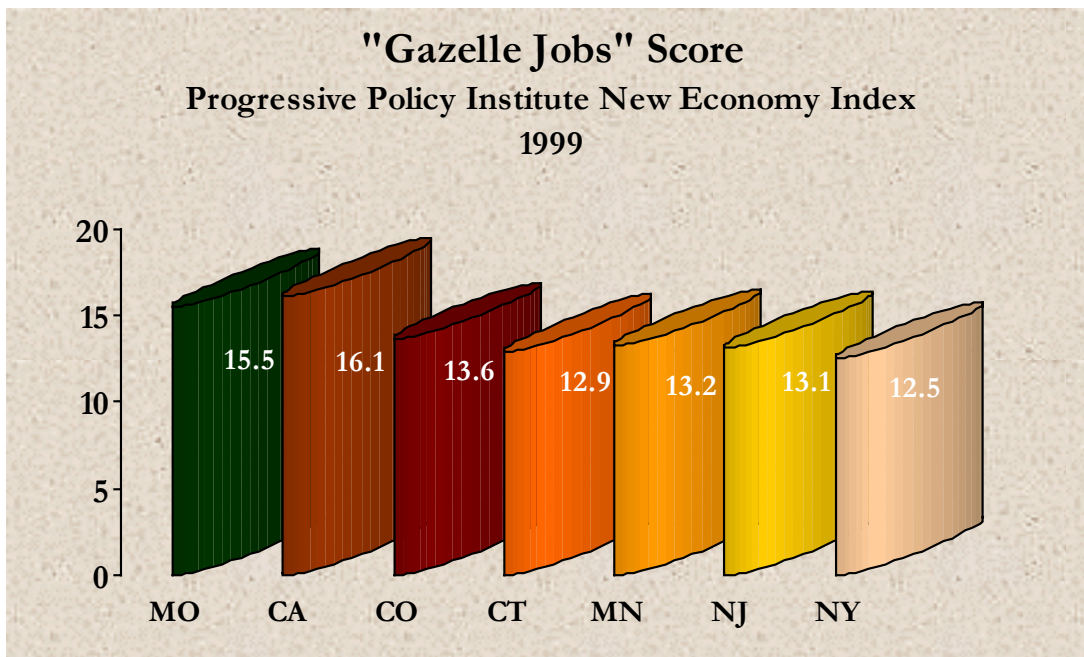
The Progressive Policy Institute provides a state ranking in gazelle jobs in its State New Economy Index for 1999.

Missouri was ranked 8th, with a score of 15.5 percent. Sixth ranked California was the only leading technology state above Missouri in the rankings, scoring 16.1 percent.

New York ranked the lowest of the leading technology states, at 41st with a score of 12.5 percent.

Rankings for the other LTS were Colorado (28th), Connecticut (37th), Minnesota (35th), and New Jersey (36th).

Nevada was ranked 1st on the list.



Source: Progressive Policy Institute

Speed

Employer Firm Births

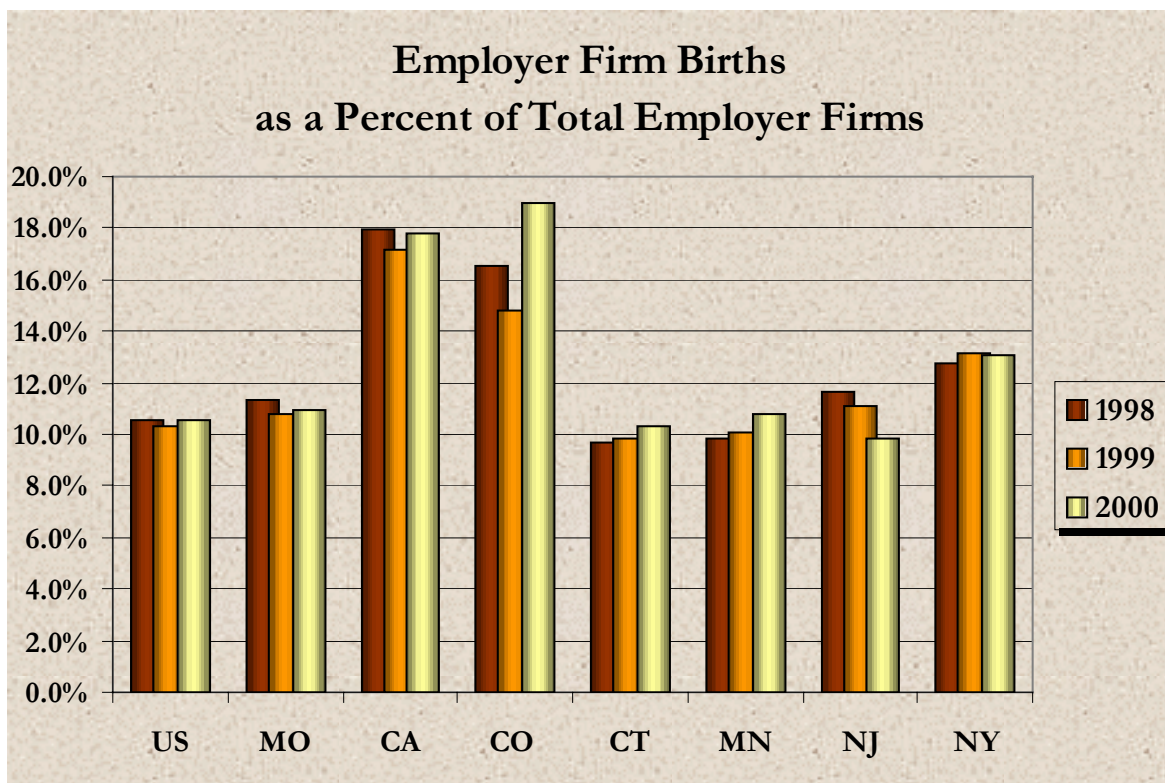
The number of new employer firm births in a year provides an estimate of new business growth in a state. Employer firms exclude those self-employed.

In 2000, Missouri's employer firm births represented 10.9 percent of total employer firms. This was just above the U.S. average in 2000 of 10.5 percent.

Missouri ranked in the middle of the leading technology states in employer firm births.

LTS below Missouri were Minnesota (10.8 percent), Connecticut (10.3 percent) and New Jersey (9.8 percent).

Other LTS ranking above Missouri and the U.S. were Colorado (19.0 percent), California (17.8 percent) and New York (13.04 percent).



Source: U.S. Small Business Administration

Speed

Employer Firm Terminations

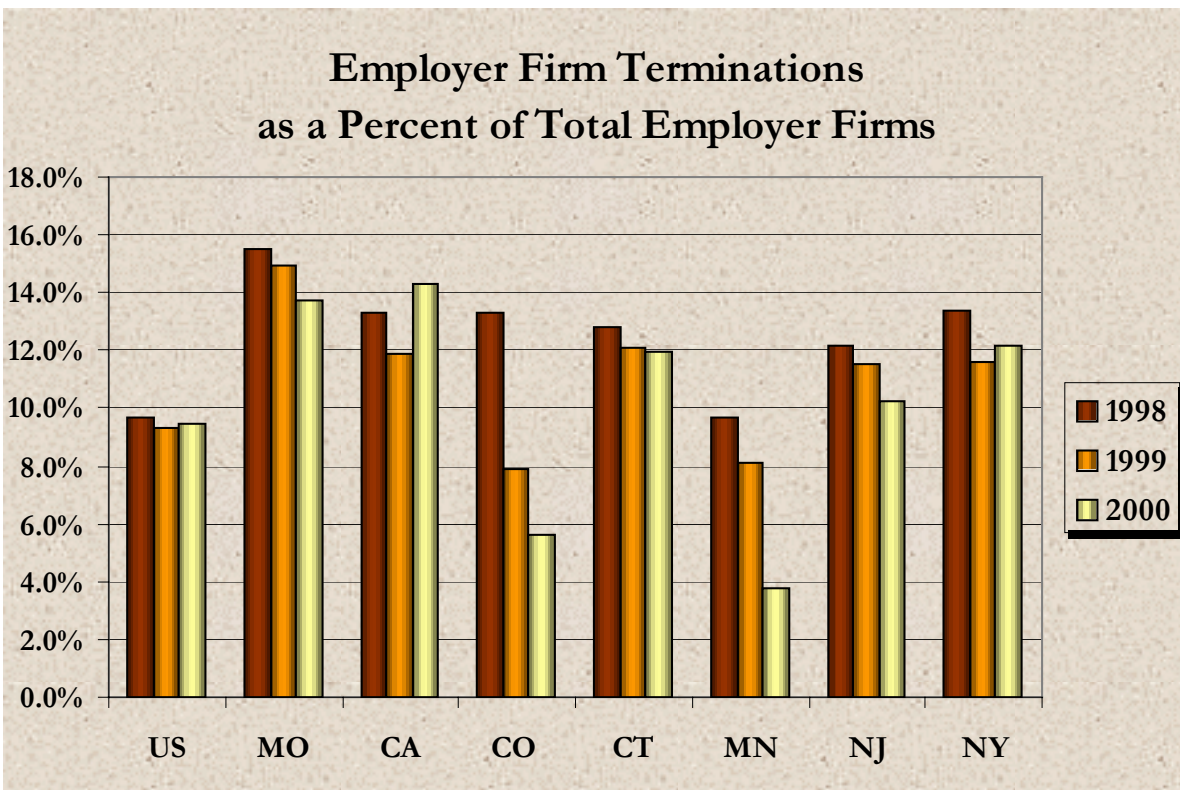
Employer firm terminations, as opposed to births, indicate the rate of business closings in a state. Employer firms do not include the self-employed.

In 2000, Missouri's employer firm terminations were 13.7 percent of total employer firms in the state. The U.S. rate was nearly four percentage points lower at 9.5 percent.

California was the only LTS ranked above Missouri in 2000 with employer firm terminations making up 14.3 percent of total employer firms.

The other LTS employer firm terminations were mixed. New York (12.2 percent), Connecticut (12.0 percent) and New Jersey (10.22 percent) were above the U.S. average.

Colorado and Minnesota were far below Missouri and the U.S. average at 5.6 and 3.8 respectively.



Source: U.S. Small Business Administration

Speed

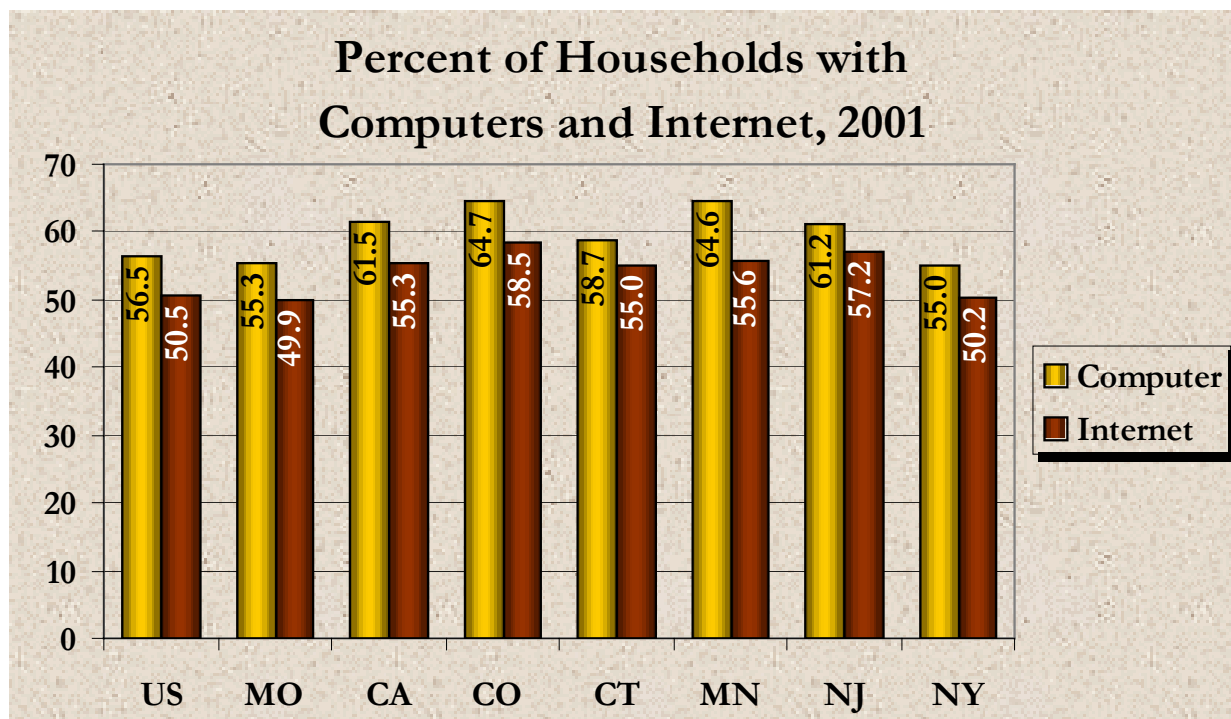
Computers and Internet in the Household

Computers and internet access in the household suggests how well a state is keeping up with changes and advancements in technology.

The percent of households with computers and internet access in 2001 in Missouri was very similar to the U.S. and LTS averages. In each category, a difference of less than ten percentage points separates the highest and lowest scores.

Despite this, Missouri ranked above only New York in computers in the household and below the U.S. and LTS in internet access in the household.

In 2001, 55.3 percent of Missouri households had a computer and 49.9 percent had internet access.



Source: National Telecommunication and Information Administration

Speed

Digital Infrastructure

The Center for Digital Government's 2000 *Digital State Survey* ranked the states based on the use of technology in state government in eight sectors: Law Enforcement and the Courts; Social Services; Electronic Commerce/Business Regulation; Taxation/Revenue; Digital Democracy; Management/Administration; Education; and GIS/Transportation.

New Jersey (6th) was the highest ranked state in the survey among Missouri and the LTS.

Missouri ranked 22nd in the survey above LTS Connecticut (27th), New York (32nd), Minnesota (37th) and California (42nd). Colorado was ranked just above Missouri at 21st.

| Digital State Ranking 2000 | |
|-------------------------------|----|
| New Jersey | 6 |
| Colorado | 21 |
| Missouri | 22 |
| Connecticut | 27 |
| New York | 32 |
| Minnesota | 37 |
| California | 42 |

Source: Center for Digital Government, Digital State Survey 2000

People

People Category

For a state to become a Leading Technology State (LTS) in today's knowledge-based economy, educated, skilled people are essential. Education in the fields of math and science are key to technological advances, thus states that have a large base of science and engineering students are better positioned in the technology arena. States striving to be technology leaders must be committed to advancing its human resources through education and workforce development.

Conversely, states that are already technology leaders are expected to have a relatively affluent population, since technology jobs are among the highest-paying jobs in the nation. The six LTS should be leaders in areas of per capita income and average wage per job, and have comparatively low poverty rates.

In general these results are played-out in the People Category of the report card. Connecticut and Minnesota are the leading states in this category, both receiving a score of 4 in four individual categories. Minnesota scores very well in the education categories, while Connecticut leads the income categories. In contrast, California received an average score of 1.0 in the People Category, despite being the leader in the Hi-Tech Industry Category.

Missouri is somewhat competitive in the People Category, in fact beating California on overall score. The state received four marks of 2, and one mark of 3 in the High School Graduates indicator. The rate of High School graduation, as shown on the following pages, has risen dramatically in Missouri over the past ten years. However, the state does not compete well in the workforce indicators, suggesting that steps need to be taken to attract and retain scientists and engineers in Missouri.

People Report Card

| | Missouri | CA | CO | CT | MN | NJ | NY |
|------------------------------------------|------------|------------|------------|------------|------------|------------|------------|
| People | | | | | | | |
| Per Capita Personal Income | 0 | 2 | 2 | 4 | 1 | 3 | 3 |
| Annual Unemployment Rate | 2 | 0 | 3 | 4 | 3 | 2 | 1 |
| Poverty Rate | 2 | 1 | 2 | 3 | 4 | 3 | 0 |
| NAEP Math Scores | 2 | 0 | 2 | 3 | 4 | | 2 |
| NAEP Science Scores | 2 | 0 | 2 | 2 | 4 | | 2 |
| HS Graduate | 3 | 0 | 3 | 3 | 4 | 3 | 1 |
| College Graduate | 1 | 1 | 4 | 3 | 3 | 2 | 2 |
| S&E Graduate Students | 0 | 2 | 3 | 3 | 1 | 0 | 4 |
| S&E Doctorates | 1 | 2 | 3 | 4 | 2 | 0 | 3 |
| Ph.D. Scientists as a % of the Workforce | 0 | 2 | 2 | 4 | 1 | 3 | 2 |
| Score | 1.3 | 1.0 | 2.6 | 3.3 | 2.7 | 2.0 | 2.0 |

People

Per Capita Personal Income

Per Capita Personal Income provides a measure of the wealth of the people on average in a state or region. Moreover, it can serve as an indicator of the wealth of a state as a whole.

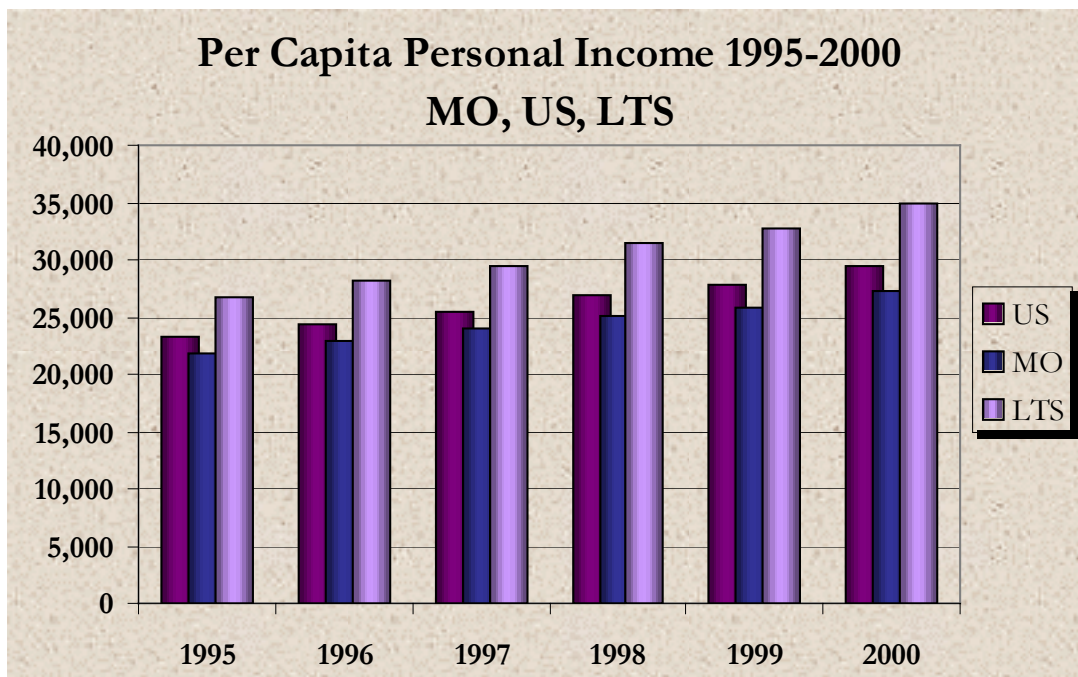
In 2000, Missouri's per capita income was \$27,186, below the U.S. average for that year of \$29,451. In Missouri, per capita personal income has been rising from 1995 to 2000, but remains below the U.S. average.

In the Leading Technology States (LTS) identified by the Massachusetts Technology Collaborative, per capita

income is considerably higher than the Missouri and U.S. averages. (California, Colorado, Connecticut, Minnesota, New Jersey and New York are considered Leading Technology States.)

In 2000, the average per capita income in LTS was \$34,844. This is more than \$7,600 higher than Missouri and \$5,300 above the U.S. average in that year.

Missouri has consistently remained below the U.S. and LTS averages from 1995 to 2000.



Source: U.S. Bureau of Economic Analysis

People

Annual Unemployment Rate

Unemployment rates relative to that of the U.S. give insight into the condition of a state's economy. The national annual unemployment rate has fluctuated from 1999 to 2001, dipping slightly from 1999 to 2000, then increasing to 4.8 percent in 2001.

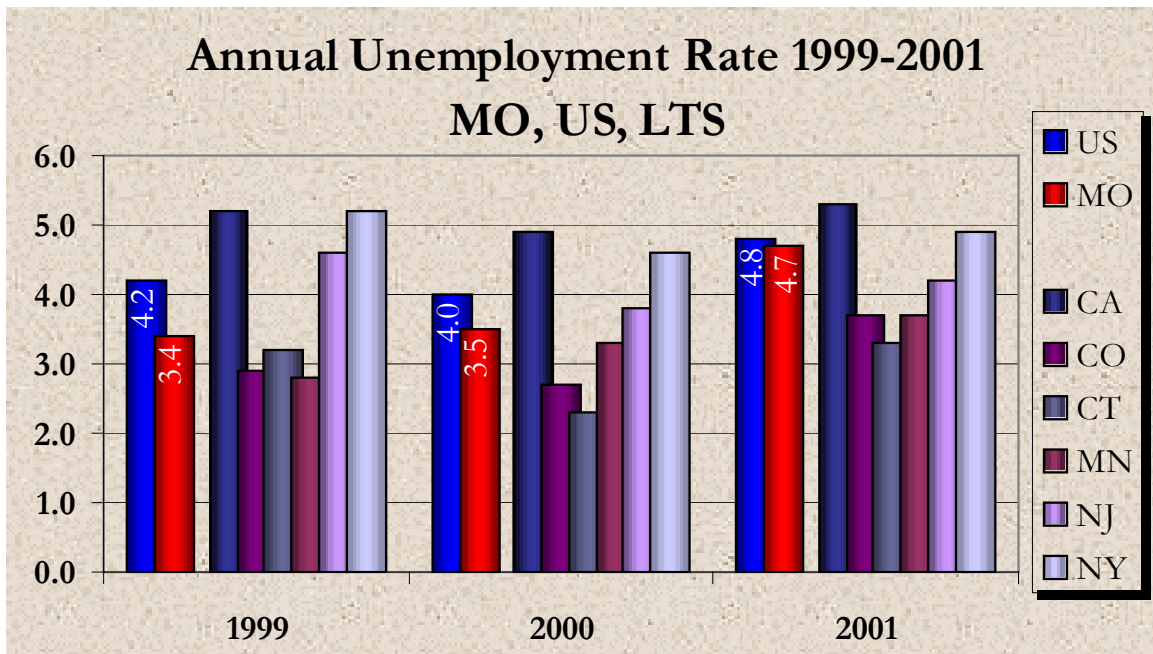
Missouri's annual unemployment rate was similar, ending up at 4.7 percent in 2001, just 0.1 percent below the U.S. average. Missouri's unemployment rate generally remains below that of the U.S.

Missouri's rate relative to LTS has varied from 1999 to 2001. Until 2001, Missouri

remained in the middle compared to LTS.

In 2001, however, Missouri's rate was surpassed only by California and New York, states that generally exceed the U.S. unemployment rate.

Missouri has been hard hit by the recession which began in March 2001, with great job losses in the manufacturing sector. Some economists say that Missouri and other Mid-Western states may have felt the effects of the recession first which could help explain Missouri's large unemployment rate increase from 2000 to 2001.



Source: U.S. Bureau of Labor Statistics

People

Poverty Rate

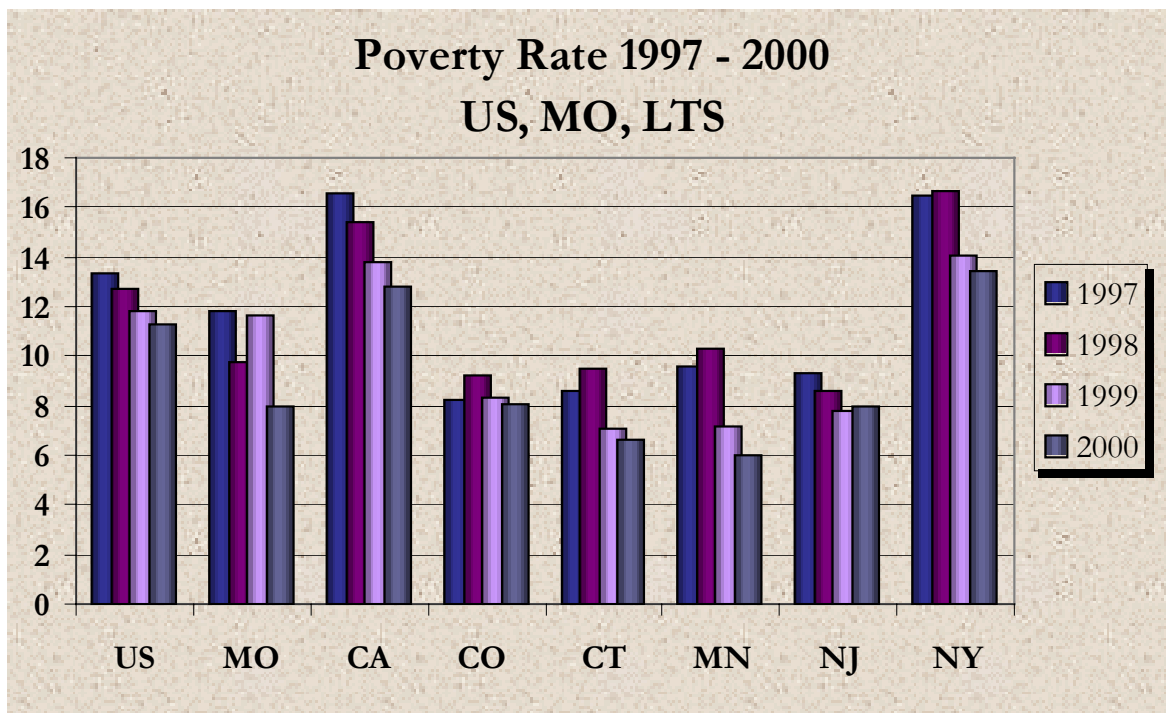
The Poverty Rate is defined as the percentage of a state's total population that falls below the poverty threshold. As with other "People" indicators, poverty rates help identify a state's overall wealth and well-being.

Missouri's poverty rate decreased from 1997 to 2000, following a pattern similar to the U.S. and other states. In 2000, the most current year available, Missouri's poverty rate of 8.0 percent was below the U.S. average of 11.3 percent. Missouri's rate is generally below that of the U.S.

Poverty rates in LTS vary. Colorado, Connecticut, Minnesota and New Jersey rank below the U.S., while California and New York have much higher poverty rates.

Although Missouri's poverty rate generally ranked above the LTS from 1997 to 1999, in 2000 Missouri's rate was consistent with Colorado (8.1 percent) and New Jersey (8.0 percent).

Poverty rates for the other LTS in 2000 were New York (13.4 percent), California (12.8 percent), Connecticut (6.6 percent) and Minnesota (6.0 percent).



Source: U.S. Census Bureau

People

NAEP Scores (Math)

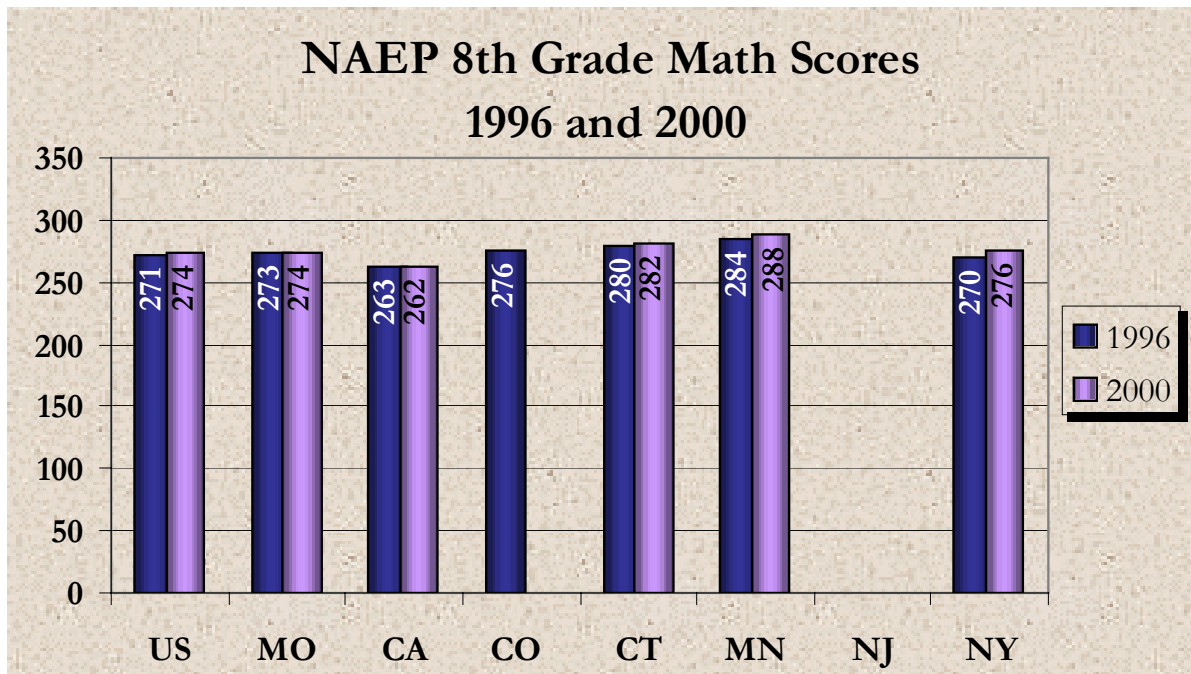
The National Assessment of Educational Progress (NAEP), led by the National Center for Education Statistics, periodically conducts national assessment tests of students in various subject areas. In the field of technology, math and science are especially important.

In NAEP Math Scores, Missouri 8th graders tested above or equal to the national averages in both 1996 and 2000. Missouri scores improved one point from 1996 to 2000.

California was the only participating LTS that scored below both the U.S. and Missouri both years.

Minnesota and Connecticut scored above the U.S. and Missouri in both 1996 and 2000, and Colorado was above both in 1996.

Scores in New York were close to Missouri and U.S. averages and showed the largest LTS increase, improving 6 points from 1996 to 2000.



Source: National Center for Education Statistics

People

NAEP Scores (Science)

In Science, Missouri students NAEP assessment score improved four points from 1996 to 2000. Missouri's scores bettered the U.S. average in both 1996 and 2000.

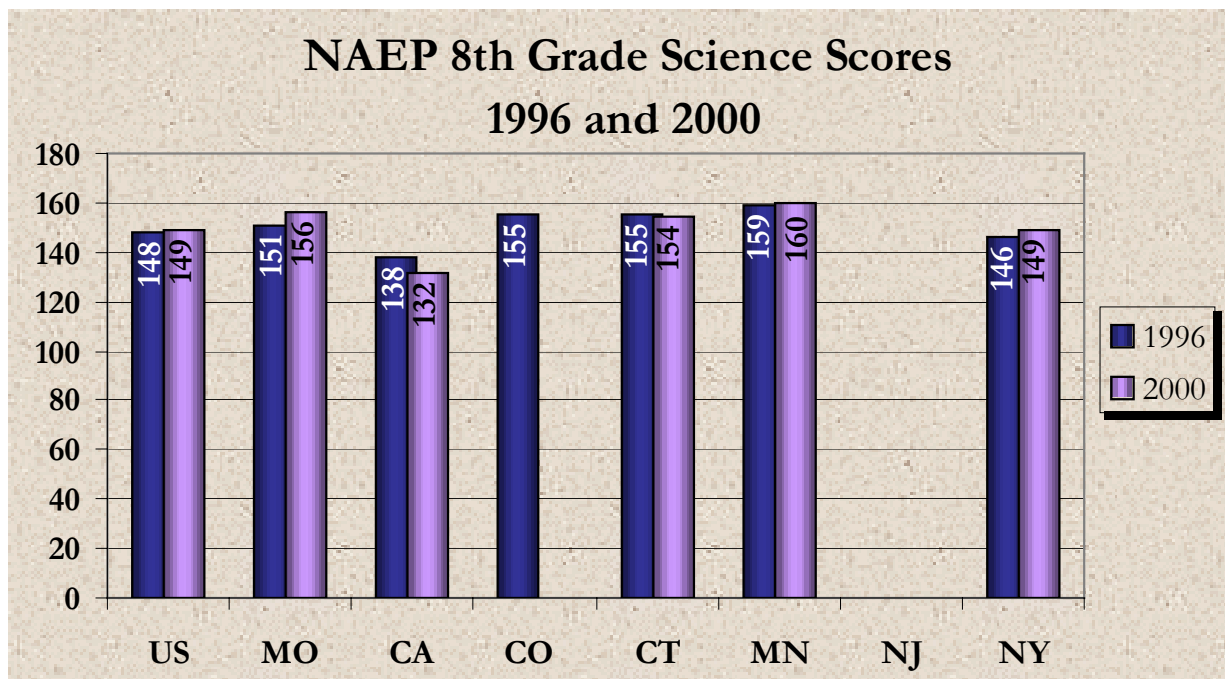
In 2000, the only participating LTS state with a score higher than Missouri was Minnesota.

Scores in California and New York ranked at or below the U.S. average in both years tested.

In both the Math and Science NAEP assessment, Missouri ranked above or

equal to the U.S. average and competitively among participating LTS.

Note: Scores in Math and Science for the 8th grade chosen for this comparison are based on national and state samples. Other grades tested were 4th and 12th. LTS not participating in 8th grade Math and Science NAEP: Colorado (2000) and New Jersey (1996 and 2000).



Source: National Center for Education Statistics

People

Education Attainment

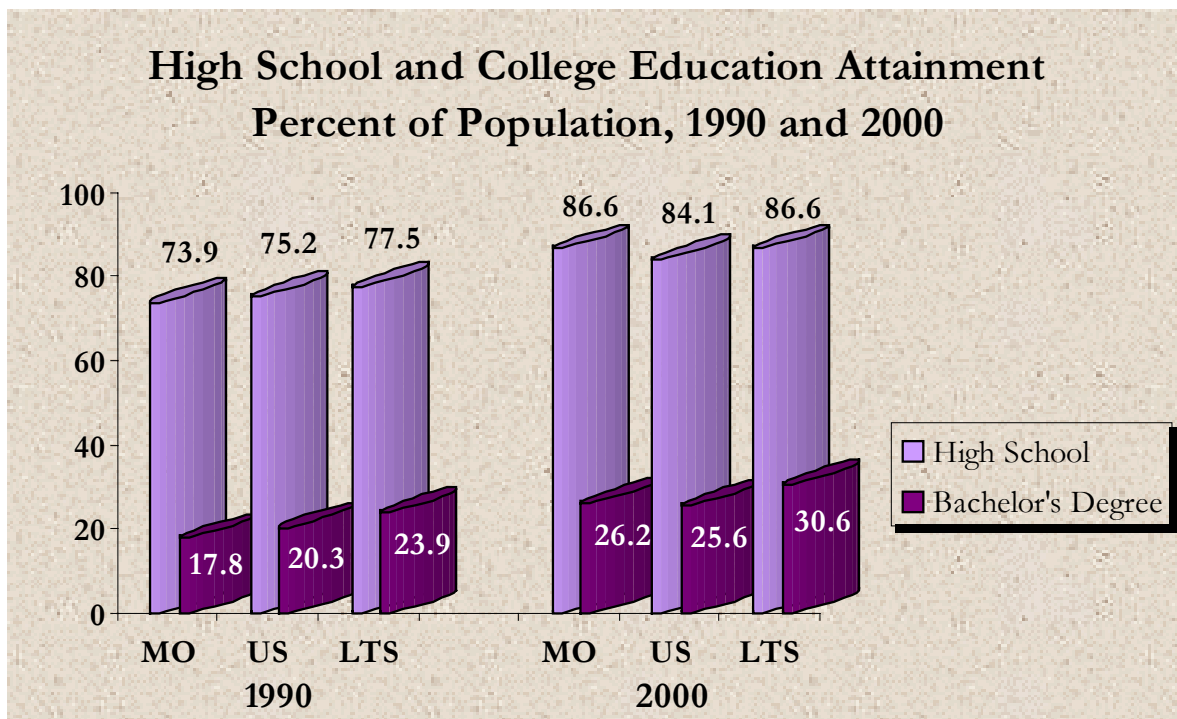
The overall education level of a state gives insight into its potential for prosperity. Knowledge and education are valuable assets and determinants of both personal income levels and general success in a state.

High school diploma attainment in Missouri increased 12.7 percentage points from 73.9 percent of the population in 1990 to 86.6 percent in 2000.

This increase placed Missouri above the national average in 2000 and equal to the average percent of high school diploma attainment of the six LTS.

College education attainment, in the form of a bachelor's degree or higher, also improved in Missouri from 1990 to 2000, and moved above the national average in 2000.

While the percent of Missouri's population with a college education increased 8.4 percentage points since 1990, it still lags nearly four percentage points behind the LTS average.



Source: National Center for Education Statistics

People

Science and Engineering Graduate Students

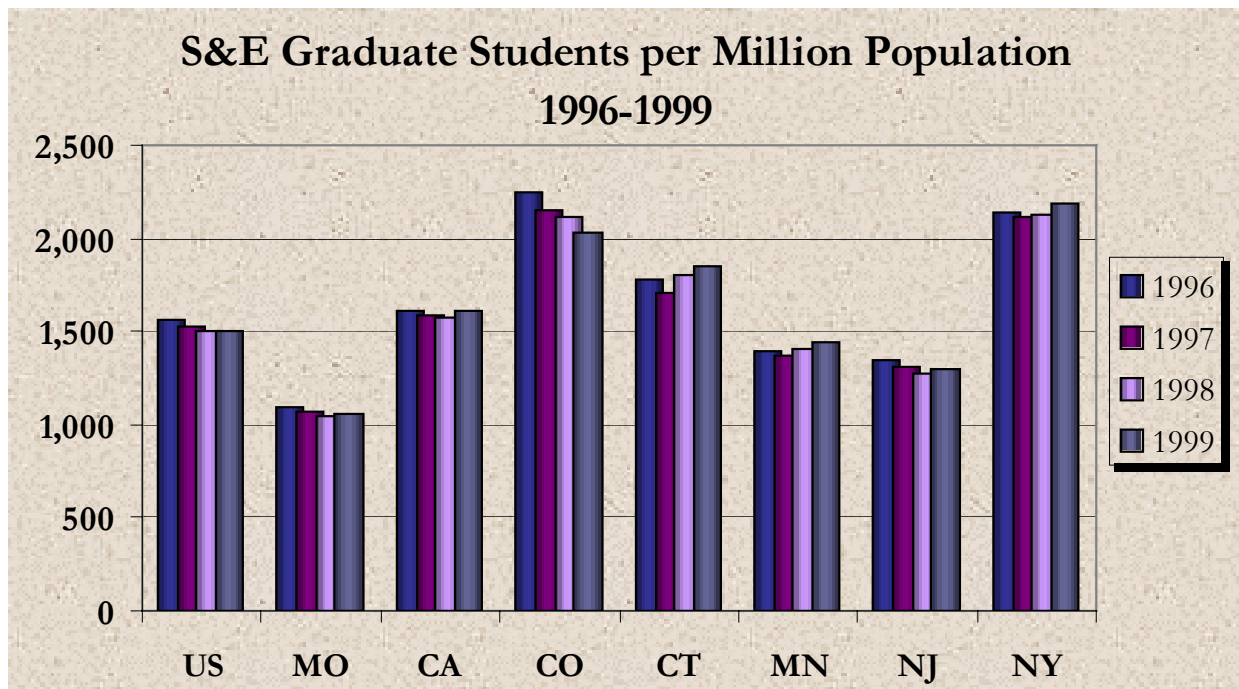
The number of Science and Engineering (S&E) Graduate Students measures how extensive science training is in a state but not how many S&E degree recipients remain in a state upon degree completion.

In the National Science Foundation survey, the field of science and engineering includes eight categories: life sciences; psychology; physical sciences; environmental sciences; mathematics and computer sciences; engineering; social sciences; and other sciences, not elsewhere classified.

In 1999, there were 411,308 S&E graduate students in the U.S. Of those, 5,805 were in Missouri.

Missouri's S&E graduate students per one million population ranked below the U.S. and LTS averages from 1996 to 1999.

Colorado, Connecticut and New York ranked above the U.S. average in S&E graduate students while the other LTS ranked at or below the U.S. average in those years.



Source: National Science Foundation

People

Science and Engineering Doctorates

As expected, Science and Engineering Doctorates per million population is much less than the number of graduate students per million population. This indicator is important, however, as doctorate-degreed individuals are often the leaders in research advancements.

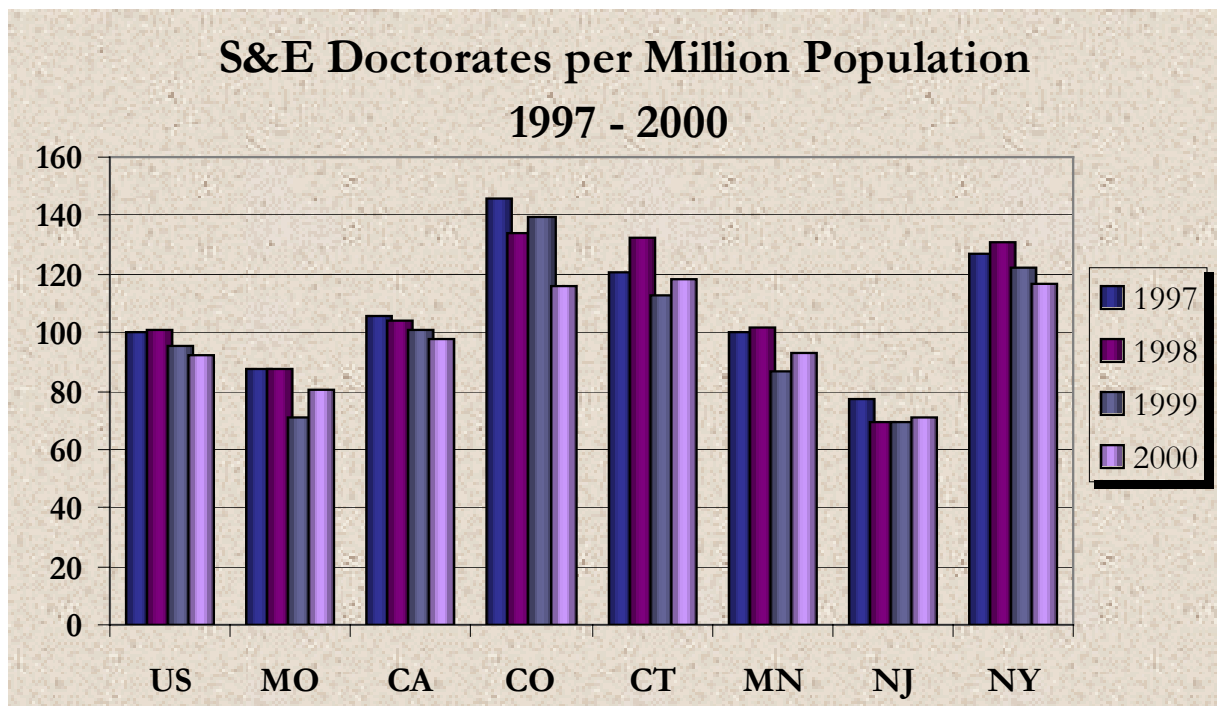
Missouri fell below the national average of S&E doctorates per million population from 1997 to 2000.

In 2000, Missouri averaged 81 S&E doctorates for every one million persons in the state. The U.S. averaged 92 and

Connecticut topped out the LTS at 118 S&E doctorates per one million population. Colorado and New York were other LTS with comparatively larger numbers of S&E doctorates.

Missouri's average was generally higher than New Jersey's, and was competitive with Minnesota and California.

Interestingly, across all the listed states and the U.S. there is a noticeable decline in S&E doctorates from 1997 to 2000.



Source: National Science Foundation

People

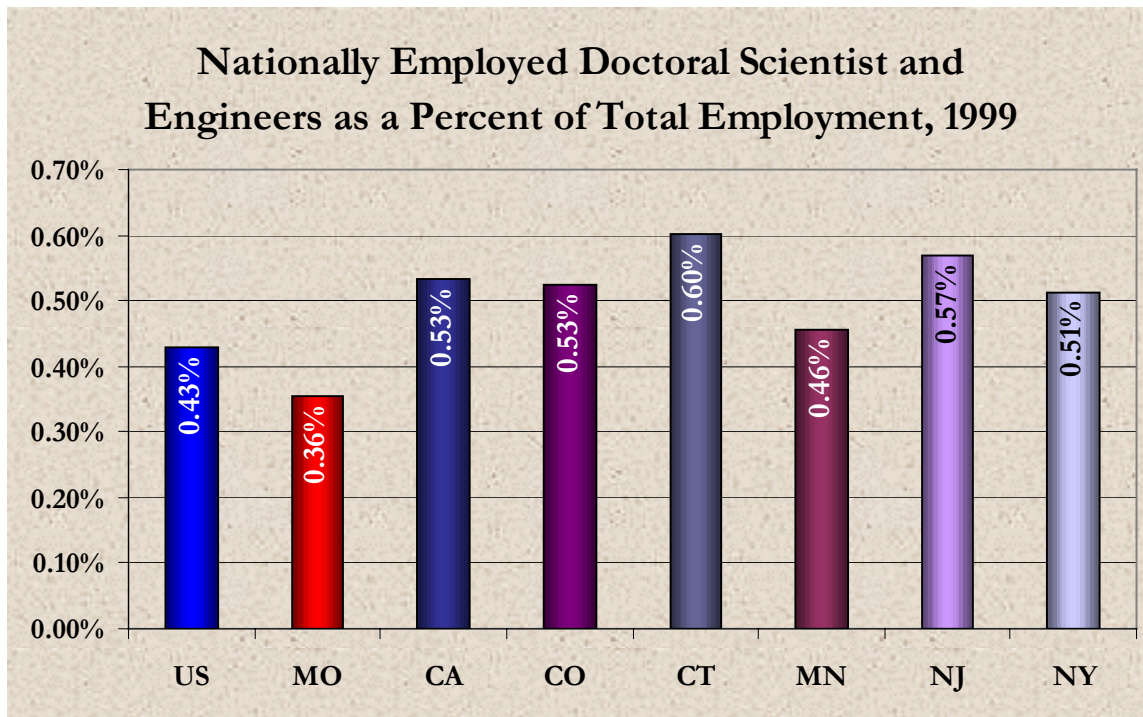
Ph.D. Scientists and Engineers in the Workforce

Ph.D. Scientists and Engineers are often involved in the creation of new products and ideas, leading a state in research and innovation advancements.

Of the more than 550,000 Ph.D. Scientists and Engineers in the U.S. workforce in 1999, 1.7 percent were employed in Missouri. Doctoral scientists and engineers made up 0.36 percent of Missouri's total employment in 1999. That was lower than the 0.43 percent of U.S. employment made up of Ph.D. scientists and engineers in 1999.

Of the Leading Technology States, Connecticut (0.60 percent) scored above both Missouri and the U.S., employing the greatest relative percentage of doctoral scientists and engineers in 1999.

Other LTS ranked above the U.S. and Missouri averages as well: New Jersey (0.57 percent), California (0.53 percent), Colorado (0.53 percent), New York (0.51 percent) and Minnesota (0.46 percent).



Source: National Science Foundation

Sources

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U.S. Patent and Trademark Office (www.uspto.gov)

U.S. Small Business Administration (www.sba.gov)

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